WHEEL SPINNER ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from United States provisional application Serial Number 60/525,692, filed November 28, 2003, which is titled "Wheel Spinner Assembly", and which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

As the design and basic shape of modern vehicles has grown more uniform due to aerodynamic styles and principles of fuel economy, consumers have become increasingly interested in distinctive or "customized" vehicle accessories. In particular, a significant marketplace has been established for distinctive wheels that are adapted for use on automobiles, trucks, motorcycles, bicycles, and other wheeled vehicles. Accordingly, there is a need for improved and distinctive wheel assemblies.

BRIEF SUMMARY OF THE INVENTION

The present invention is directed to improved wheel spinners, and improved wheel/wheel spinner combinations. In particular, various embodiments of the invention provide an improved wheel/spinner assembly (which may be referred to as one type of "wheel assembly") that provides enhanced visual and functional effects. According to various embodiments of the invention, the improved wheel assembly comprises: (1) a first rotating member, such as a wheel; (2) a visual element such as a logo or other visual indicia mounted adjacent (e.g., affixed to) an exterior surface of the first rotating

member; and (3) a second member, such as a wheel spinner, mounted to rotate adjacent the first rotating member. According to one embodiment, the second member is mounted substantially concentrically with the first rotating member. In another embodiment, the first rotating member and the second member are configured to rotate about a central (preferably common) axis of rotation.

According to several embodiments, the second member defines one or more openings having an outer perimeter. The openings are sized to visually frame the one or more visual elements provided adjacent (e.g., attached to) the exterior surface of the first rotating member. Accordingly, when substantially aligned in a home position, the visual elements are readily apparent to an observer viewing the wheeled vehicle. Alternatively, when oriented in a first position in which the first and second members are not substantially aligned, the visual elements are not substantially viewable to an observer, or are partially obstructed from an observer's view.

In several other embodiments, the wheel assembly of the present invention may be a themed wheel assembly. As referenced above, a themed wheel assembly according to one embodiment of the invention includes a first rotating member and one or more visual elements disposed adjacent (e.g., affixed to) the exterior surface of the first rotating member. In one embodiment, the visual elements include a design, logo, or indicia not typically associated with a wheel or rim. For example, the visual elements may include a plurality of bullet indicia, one or more sports logos, playing cards, roulette numerals, or other similar elements. Moreover, the themed wheel assembly according to several embodiments of the invention includes a second member mounted to rotate adjacent the first rotating member. In one embodiment, the second member is configured to complement the theme established by the visual elements, thereby creating a themed visual effect. According to one embodiment, the second member achieves a themed structure by including one or more openings and/or recesses as discussed in further detail below.

As referenced above, in one embodiment, the first rotating member may be a wheel that includes a rim, a mounting area, and a hub or median region disposed therebetween. In one embodiment, a themed wheel assembly includes a plurality of bullet indicia that are adjacent (e.g., formed into or affixed to) the exterior surface of the

wheel. In one embodiment, the bullet indicia are configured to resemble the firing end of a bullet. In another embodiment, the bullet indicia are distributed in a substantially uniform radial pattern about the median region of the wheel (e.g., so that the center of at least one, and preferably all, of the various bullet indicia are spaced apart from the center of a neighboring bullet indicia by a pre-determined distance).

In one embodiment, the second member is a wheel spinner having a substantially circular shape. The wheel spinner defines a plurality of substantially circular openings configured to substantially align with one or more corresponding bullet indicia when the wheel spinner is oriented in a home position. Accordingly, in one embodiment of the invention, when the wheel spinner is in this home position, the various bullet ends cooperate with the wheel spinner to produce the visual appearance of a loaded revolver-cylinder. In one embodiment, the themed wheel assembly may include a plurality of (e.g., five or six) bullet indicia and a corresponding plurality of wheel spinner openings that may be aligned with the six bullet indicia to create the appearance of a multi-bullet revolver cartridge. In another embodiment, the wheel spinner may include a plurality of substantially semi-circular recesses that are defined adjacent the outer perimeter of the wheel spinner and that are positioned between adjacent spinner openings to resemble the outer contour of discrete bullet chambers. This further enhances the revolver-like appearance of the wheel assembly.

In various other embodiments, the themed wheel assembly may include several additional themes. For example, a sports theme, such as a baseball theme, may be provided in which the wheel spinner is configured to resemble a baseball or baseball bat. In one embodiment, the ball or bat-shaped wheel spinner includes one or more openings for viewing a plurality of team logos that are provided on the exterior surface of an adjacent wheel. In another embodiment, a stop-motion animation theme may be created. According to this embodiment, the wheel spinner is configured to maintain a fixed radial orientation despite relative rotation of an adjacent wheel. The second member includes an opening for viewing various stop-motion elements provided on the exterior surface of the wheel as described in further detail below. Other similar themes as known to one of ordinary skill in the art (e.g., roulette, poker or playing card themes) may be employed without deviating from the inventive concepts disclosed herein.

In one embodiment, the wheel assembly is comprised essentially as described above, however, the wheel assembly further comprises an aligning mechanism that rotates the second member from a first position in which the openings of the second member are misaligned relative to the visual elements of the first member, to a home position in which the openings of the second member are substantially aligned relative to the visual elements of the first rotating member. In one embodiment, the aligning mechanism includes a first weighted portion affixed to the first rotating member, a second member mounted to rotate adjacent the first rotating member, and a second weighted portion affixed to the second member. The first and second weighted portions are preferably affixed, respectively, to the first rotating member and the second member such that gravity acts to position the weighted portions of the members substantially below their respective rotational axes. Accordingly, the openings and visual elements may be configured to reach a substantially aligned or home position when the first rotating member and the second member are brought substantially to rest.

In other embodiments, the self-aligning mechanism may be an electromagnetic or other similar device for securing the second member in a given orientation relative to the first rotating member. In still another embodiment, a locking mechanism, such as a screw or cap nut may be provided to manually fix the orientation of the second member relative to the first rotating member.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a wheel assembly according to one embodiment of the invention, wherein the wheel spinner is rotatably secured to a wheel for supporting an automobile.

Figure 2 is a perspective view of a conventional wheel mount as may be provided on an automobile, truck or all-terrain-vehicle.

Figure 3 is a detail view of a wheel according to one embodiment of the invention, wherein the wheel is installed adjacent the conventional wheel mount depicted in Figure 2.

Figure 4 is a detail view of an inner surface of a wheel spinner according to one embodiment of the invention, wherein the wheel spinner defines a plurality of openings and includes a centrally-disposed bearing assembly.

Figure 5 is a front view of a wheel assembly according to one embodiment of the invention, wherein the wheel spinner is in a "home" rotational orientation.

Figure 6A is a front view of a self-aligning wheel assembly according to one embodiment of the invention, wherein the first rotating member is a substantially circular member that is mounted to rotate between a wheel and a wheel spinner. The depicted self-aligning wheel assembly further includes an aligning mechanism according to one embodiment of the invention.

Figure 6B is a side view of the self-aligning wheel assembly depicted in Figure 6B.

Figure 7 is a front view of the self-aligning wheel assembly of Figure 6, wherein the aligning mechanism has returned the self-aligning wheel assembly to a "home" position.

Figure 8A is a front view of the self-aligning wheel assembly in accordance with one embodiment, wherein the self-aligning wheel assembly comprises an electromagnetic aligning mechanism.

Figure 8B is a section view of the self-aligning wheel assembly of Figure 8A, taken along section line 8B-8B.

Figure 9A is a front view of a selectively-locking wheel assembly in accordance with one embodiment, wherein the selectively-locking wheel assembly comprises a screw-type locking mechanism.

Figure 9B is a detailed section view of the selectively-locking wheel assembly of Figure 9A, taken along section lines 9B-9B.

Figure 10A is a front view of a selectively-locking wheel assembly having a cap-lock mechanism according to one embodiment of the invention.

Figure 10B is a side detail view of the selectively-locking wheel assembly depicted in Figure 10A, taken along section lines 10B-10B.

Figure 11 is a front view of a football-helmet themed wheel assembly according to one embodiment of the invention.

Figure 12 is a front view of a stop-motion themed wheel assembly according to one embodiment of the invention.

Figure 13 is a front view of a football themed wheel assembly according to one embodiment of the invention.

Figure 14 is a front view of a baseball themed wheel assembly according to one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all, embodiments of the invention are shown. Indeed, these inventions may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that the disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

Figure 1 illustrates a wheel assembly **10** according to one embodiment of the invention. In particular, the depicted wheel assembly **10** includes a first rotating member **20**, such as a wheel, and a second member **30**, such as a wheel spinner, that is provided to enhance the appearance of a wheeled vehicle **15**. Although depicted in Figure 1 as an automotive accessory, it should be noted that wheel assemblies according to the present invention are not limited to automobiles, but instead, may be applied to many other types of wheeled vehicles such as automobiles, motorcycles, trucks, all-terrain vehicles ("ATVs"), bicycles, and the like.

As may be understood from the illustration provided by Figure 1, the wheel assembly **10** comprises a first rotating member **20** and a second member **30** that is mounted to rotate adjacent the first rotating member **20**. According to the depicted embodiment, the first rotating member is a wheel **20** and the second member is a wheel spinner **30**. In one embodiment of the invention, the wheel spinner **30** is mounted substantially concentrically with the wheel **20**. Both the wheel **20** and the wheel spinner **30** are configured to rotate about a central (preferably common) axis of rotation **31**. In one embodiment, the wheel spinner **30** is attached to a bearing (not shown) in a manner known in the art so that the wheel spinner **30** may spin independently of the wheel **20**. As discussed in detail below with regard to Figures 6 and 7, in other embodiments of the invention, the first rotating member need not be a wheel, and in fact, may be a rotating member positioned between the wheel and the second member. In other embodiments discussed below with regard to Figure 12, the second member need not be a wheel spinner, and in fact, is not be configured to provide stationary (rather than spinning) appearance in use.

Returning to the embodiment illustrated in Figure 1, the wheel **20** includes one or more visual elements **25** that are disposed adjacent (e.g., affixed to, or are part of) the wheel's exterior face. Each visual element **25** may include, for example, a discrete visual design, logo, indicia, light source, or the like. In another embodiment, the wheel spinner **30** defines one or more openings **33** and/or one or more recesses **34** that are configured to create a themed visual effect when the wheel spinner's openings **33** and/or recesses **34** are in a pre-determined angular orientation relative to the wheel **20**. According to several embodiments of the invention, the wheel **20** is comprised of known materials such as aluminum, stainless steel, coated steels and the like.

In one embodiment of the invention, the wheel assembly **10** may be adapted for installation adjacent a conventional vehicle wheel mount **18** of a wheeled vehicle **15**. One such conventional wheel mount is shown in Figure 2. Typically, such wheel mounts **18** include a substantially planar mounting surface **12** having a plurality of radially distributed wheel mount bolts **19** extending therefrom. During operation of the wheeled vehicle (not shown), the wheel mount bolts **19** secure the wheel (not shown) adjacent the planar mounting surface **12**. The planar mounting surface **12** may be driven to rotate by the vehicle's transmission or other propulsion system (not shown) or optionally may freely rotate about an axle in non-driven wheels. The wheel mount **18** depicted in Figure 2 has been provided merely for illustration purposes, and thus, should not be construed as limiting. As known to one of ordinary skill in the art, many additional types of wheel mounts **18** (e.g., truck, motorcycle, A.T.V., and the like) may be readily used to support wheel assemblies in accordance with various embodiments of the present invention.

Figure 3 illustrates one embodiment of the invention wherein a wheel **20** is positioned (i.e., installed) adjacent the planar mounting surface **12** of a conventional automobile wheel mount **18**. Upon installation, the wheel mount bolts **19** extend through opposing holes configured within a central mounting area **23** located on the wheel **20** as shown. The wheel mount bolts **19** are threaded to engage lug nuts (not shown) that are provided to lock the wheel **20** in place during vehicle operation. In addition to the central mounting area **23**, the wheel **20** includes a rim **22** for supporting a tire **17** and hub or median region **24** defined between the rim **22** and mounting area **23**. Further, it is

customary in the art to provide a plurality of weight-reducing areas **28** (e.g., cut outs) distributed about the median region **24** as shown.

As referenced above, in one embodiment, the wheel **20** includes one or more visual elements **25** that are disposed adjacent (and are preferably mounted on, or are integral to) the exterior surface of the median region **24** of the wheel **20** as shown. Each visual element **25** may include, for example, a discrete visual design, a logo, an indicia or one or more light sources. The visual elements **25** provide a themed effect that may be recognizable to an observer. In the depicted embodiment, the visual elements **25** include a first visual element **75**, a second visual element **76**, a third visual element **77**, a fourth visual element **78**, a fifth visual element **79**, and a sixth visual element **80**. In other embodiments, more of fewer visual elements **25** may be provided. For example, in one embodiment, only a single visual element **25** may be disposed within the median region **24**.

In one embodiment, the visual elements **25** may be distributed in a uniform fashion at regular angular intervals about the wheel **20**. For example, in wheels **20** having six visual elements **25** the elements may be distributed about the wheel **20** at 60 degree intervals along a circle that is substantially concentric with the wheel's axis of rotation. By the same token, in one embodiment having two visual elements **25**, the visual elements are spaced apart at 180 degree intervals along a circle that is substantially concentric with the wheel's axis of rotation. Similarly, in one embodiment having four visual elements **25**, the visual elements are spaced apart by 90 degree intervals along a circle that is substantially concentric with the wheel's axis of rotation.

In another embodiment, the visual elements **25** are equidistant from the wheel's axis of rotation **31**. This ensures proper alignment with substantially uniformly spaced openings provided in a wheel spinner as discussed in detail below. In yet another embodiment, individual visual elements **25** define an outer perimeter or border **26** for further enhancing the element's visual effect. In various embodiments, the visual elements **25** may be painted or include inserts or coatings of various secondary materials (e.g., powder coat, chrome-plate, gold-plate, polymer inserts, and the like) to further enhance the wheel's appearance.

In embodiments having known weight-reducing areas (e.g., cutouts) as referenced above, the visual elements **25** may be distributed radially within the median region **24** adjacent the weight-reducing areas **28**. For the purposes of this application, weight-reducing areas **28** include holes, apertures, or openings that are provided in the median regions of wheels to reduce the overall weight of the wheel. In one embodiment, the visual elements **25** are distributed uniformly (i.e., evenly or consistently about the median region of the wheel spinner) in alternating relation to the weight-reducing areas **28** as shown in Figure 3. In other embodiments, however, two or more visual elements **25** may be provided between two adjacent weight-reducing areas **28**.

Figure 4 illustrates the inner surface of a wheel spinner **30** according to one embodiment of the present invention. According to the depicted embodiment, the wheel spinner **30** is rotatable about an axis of rotation **31** and includes an outer perimeter **32**. Although depicted as substantially circular, the wheel spinner **30** in accordance with various other embodiments of the invention may be of any shape (e.g., circular, oval, rectangular, triangular, or any other themed shape as discussed in detail below). A median region **35** is defined between the outer perimeter **32** and the axis of rotation **31**. In one embodiment, the wheel spinner **30** defines one or more openings **33** (and preferably a plurality of openings) within the median region **35** that are shaped and configured to complement the shape and distribution pattern of corresponding visual elements **25** on the wheel's exterior face.

In the embodiment of the invention shown in Figure 4, the wheel spinner's openings **33** include a first opening **81**, a second opening **82**, a third opening **83**, a fourth opening **84**, a fifth opening **85**, and a sixth opening **86**. As shown in Figure 5, these openings **81 – 86** are configured, respectively, to substantially align with the first through sixth visual elements **75 - 80** of the wheel **20** discussed above with regard to Figure 3. The alignment of the wheel spinner's openings **33** and the wheel's visual elements **25** will be discussed in greater detail below.

In one embodiment of the invention, a bearing assembly **40** is provided for rotatably coupling the wheel spinner **30** to the wheel **20**. For example, in the embodiment illustrated by Figure 4, the bearing assembly **40** includes a housing **42** having a centrally-disposed hub **44** for receiving a bearing **45**. The bearing **45** is of a

type generally known in the art and defines a circular opening **47** for receiving a bearing pin **48** that is coupled at its opposing end to the wheel spinner **30**. The bearing pin **48** supports the wheel spinner **30** adjacent the bearing assembly **40** and provides a pivot axis about which the bearing assembly **40** and spinner **30** may rotate. The bearing **45** itself may be comprised of a simple bushing, a race having a plurality of ball-bearings or other similar means as commonly known in the art. In one embodiment, the bearing housing **42** includes a plurality of slots **46** for receiving the various patterns of conventional wheel mount bolts (not shown).

Figure 5 illustrates an installed wheel assembly **10** in accordance with one embodiment of the present invention. According to several embodiments of the invention, the wheel spinner **30** is installed by inserting the wheel mount bolts **19**, extending through the adjacent and previously installed wheel **20**, into the slots **46** provided in the bearing housing **42** as shown. Lug nuts (not shown) may then be tightened over the wheel mount bolts **19** to lock the wheel **20** and wheel spinner **30** in place. In one embodiment, one or more access holes **36** are provided through the wheel spinner **30** so that the lug nuts, positioned on wheel mount bolts **19** behind the wheel spinner **30**, may be readily accessed even after the wheel spinner **30** has been installed. In one embodiment, a decorative cap **50** may optionally be provided to cover the access hole **36** and other wheel spinner **30** mounting structures (i.e., the bearing pin, washers, and other similar fasteners). In one embodiment, the decorative cap **50** may include a complementary visual element (not shown) adapted to mirror or complement the theme established by the wheel's visual elements **25** as discussed further below.

The wheel spinner **30** is structured and mounted so that the wheel spinner **30** is capable of achieving a pre-determined angular orientation relative to the wheel **20**, wherein at least one of (and preferably a plurality of) the wheel spinner's openings **33** substantially align with one (or preferably several) visual element **25** on the wheel **20**. In particular, according to several embodiments, the wheel spinner **30** is substantially aligned such that the one or more visual elements **25** of the wheel **20** are substantially centered within the one or more openings **33** defined by the wheel spinner **30**. For the purposes of this application, a pre-determined angular orientation wherein the wheel spinner openings **33** are substantially aligned with the wheel visual elements **25** may be

referred to as a "home" angular orientation or "home position." Moreover, the overlapping-aligned relationship between the wheel spinner openings **33** and the wheel's visual elements **25** (e.g., as shown in Figure 5) may be referred herein as a "mirrored" relationship.

As illustrated in Figure 5, in one embodiment of the invention, when the wheel spinner **30** is in the shown, "home" position relative to the wheel **20**, the wheel spinner's first opening **81** aligns with the first visual element **75**. Similarly, the second opening **82** aligns with the second visual element **76**; the third opening **83** aligns with the third visual element **77**; the fourth opening **84** aligns with the fourth visual element **78**; the fifth opening **85** aligns with the fifth visual element **79**; and the sixth opening **86** aligns with the sixth visual element **80**. As referenced above, this embodiment is provided for illustration purposes only. As will be understood from Figure 5, when the spinner is in other "home" positions, the wheel spinner's first opening **81** may alternatively align with the second, third, fourth, fifth or sixth visual elements **76, 77, 78, 79, 80** of the wheel **20**.

According to various embodiments, the wheel assembly of the present invention may be a themed wheel assembly. Similar to the embodiments discussed above, in particular embodiment of the invention, the themed wheel assembly includes a wheel and one or more visual elements disposed adjacent an exterior surface of the wheel. The themed wheel assembly also includes a wheel spinner mounted to rotate adjacent the wheel. In one embodiment, the wheel spinner is configured to create a themed visual effect by defining a series of openings and/or recesses. More particularly, the structure of the wheel spinner is configured to complement the one or more visual elements provided adjacent the exterior surface of the wheel. As will be understood by one skilled in the relevant field, the wheel spinner and wheel may cooperate to produce visual effects having various themes.

For example, Figures 1-8 depict a wheel assembly that conveys a revolver-cylinder theme. In particular, Figure 5 depicts a revolver-cylinder themed wheel assembly **10** comprising a wheel spinner **20** defining six openings **33** and six recesses **34**. In addition, six visual elements **25** are disposed adjacent the exterior surface of the wheel **20** (in this embodiment, the visual elements **25** are actually attached to the wheel **20**).

In one embodiment, the wheel spinner's openings **33** and the six visual elements **25** are dimensioned and radially positioned so that the wheel spinner **30** may be rotated to a home angular position relative to the wheel **20** (and/or relative to the visual elements **25**) as referenced above. In this home position, each of the wheel spinner's openings **33** substantially aligns with a corresponding visual element **25** of the wheel **20** as discussed above. In one embodiment of the invention, the wheel spinner **30** may be moved to a home position, wherein each of the visual elements **25** are substantially centered within a corresponding spinner opening **33** as shown. As will be understood in light of this disclosure, a particular wheel spinner **30** may have a variety of different home positions.

In one embodiment, such as that depicted in Figure 5, individual visual elements **25** may include a border **26** to emphasize the theme or set-off a visual element **25** from the surrounding wheel **20**. In one embodiment, one or more openings **33** defined by the wheel spinner **30** may be configured to substantially concentrically align with one or more of the visual elements **25** when the wheel spinner **30** is positioned in the above-referenced home position. In one embodiment of the invention, when the wheel spinner **30** is in this position, the outer perimeter of at least one (and preferably all) of the openings **33** substantially aligns with the outer perimeter of one of the visual elements **25**.

Further, although depicted in Figure 5 as circular, the visual elements **25** and corresponding wheel spinner openings **33** need not have a circular shape and may in fact be in the form of any suitable shape (e.g., oval, triangle, square).

In other embodiments, the spinner **30** and wheel **20** (including the various visual elements **25**) are configured to further enhance their themed appearance or visual effect. For example, in one embodiment, the various openings **33** are spaced substantially uniformly apart (e.g., at regular intervals about the spinner **30**) to create the visual appearance of a revolver-cylinder. Furthermore, according to this embodiment, at least one of the visual elements **25** (and preferably all of the visual elements) is configured to resemble the firing end of a bullet (including caliber indicia **56**, a manufacturer indicia **52**, and a firing pin indicia **54**). As a result, the wheel **20** and wheel spinner **30** cooperate to produce the appearance of a loaded revolver chamber. Thus, the wheel **20** and wheel spinner **30** cooperate to produce a revolver-themed appearance.

In other embodiments, optional, uniformly-spaced, semicircular recesses **34** may be circumferentially disposed about the spinner **30** to create a chambered effect, thereby further enhancing the revolver-themed visual effect as shown. In one embodiment, these semicircular recesses **34** may be radially spaced at regular intervals about the perimeter **32** of the wheel spinner **30** as shown. For example, as shown in Figure 5, in applications having six semicircular recesses **34** the recesses may be provided at 60 degree intervals along the wheel spinner perimeter **32**. Further, in another embodiment, such as that depicted in Figure 5, the individual semicircular recesses **34** may have substantially the same size and shape as adjacent recesses **34** (e.g., one or more, and preferably all, of the recesses **34** may be of substantially the same size and shape). In other embodiments, however, the size and shape of the semicircular recesses **34** may vary between adjacent or alternately adjacent recesses **34** (not shown).

Figures 6-8 illustrate the operation of various self-aligning wheel assemblies in accordance with several embodiments of the present invention. Notably, these figures depict wheel assemblies **100, 200** that are constructed in a manner similar to the embodiments of the invention described above. However, the depicted embodiments further comprise aligning mechanisms **160, 260** that are configured to return the second member (e.g., wheel spinner **130, 230**) to a particular angular orientation relative to the first rotating member **120, 220**.

For example, turning to Figures 6 and 7, the aligning mechanism **160, 260** functions to return the self-aligning wheel assembly **100** from a first position (shown in Figure 6A) in which the wheel spinner openings **133** and visual elements **125** are substantially misaligned, to a "home" position (shown in Figure 7) wherein the wheel spinner openings **133** and the visual elements **125** are substantially aligned. In one embodiment, the openings **133** and visual elements **125** are substantially aligned when they are substantially concentric. The openings **133** and visual elements **125** are considered to be substantially aligned when their respective perimeters are substantially aligned relative to each other as shown in Figure 7. The openings **133** and visual elements **125** are considered to be misaligned when their respective perimeters are not substantially aligned relative to each other as shown in Figure 6A.

As will be understood by one skilled in the art in light of this disclosure, many different types of mechanisms may be used as aligning mechanisms **160**. For example, Figures 6 and 7 depict a gravitational or weighted aligning mechanism **160** in accordance with one embodiment of the invention. According to this embodiment, a first rotating member **120** (e.g., a planar member) is mounted to rotate adjacent a vehicle. As referenced above, a second member (e.g., a wheel spinner **130)** is mounted to rotate adjacent the first rotating member **120** such that the first rotating member **120** is positioned between the second member **130** and a wheel **16**, as shown in Figure 6B.

In one embodiment, the first rotating member **120** and the second member **130** may include first and second weighted portions **162, 163** positioned along one or more outer edges of the first and second members **120, 130**. When the forces (e.g., friction transmitted through the bearing from the rotating wheel, wind resistance from a moving vehicle, etc.) are removed that cause the self-aligning wheel assembly **100** to rotate, the first rotating member **120** and the second member **130** gradually stop spinning.

Accordingly, as the first and second members **120, 130** slow below a certain rotational velocity, the first and second members **120, 130** will cease to have the momentum to make a full revolution. Eventually, gravity causes the respective weighted portions **162, 163** to settle substantially below the common axis of rotation **131** of the first and second members **120, 130**. In one embodiment of the invention, as shown in Figure 7, the position of the respective weighted portions **162, 163** may be indexed relative to one another such, when the first rotating member **120** and the second member **130** are at rest, the first and second members **120, 130** is oriented in a substantially aligned or home position at rest.

Figures 8A-8B illustrate yet another embodiment of the invention wherein the aligning mechanism **260** is triggered to substantially align the self-aligning wheel assembly **200** in response to a pre-determined condition. For example, in the depicted embodiment the aligning mechanism **260** includes an electromagnet **264**, an optical or other similar sensor **265** and a controller **266**. These components are configured for communication between one another by electrical, wireless, or other similar means. In one embodiment, an indexing mark **267** or other similar locator is provided on the interior surface of the wheel spinner **230** as shown. Thus, in a manner that will be

understood by one of ordinary skill in the art in light of this disclosure, the controller **266** can monitor the position of the indexing mark **267** via the sensor **265** and thereby derive the rotational velocity and relative position of the wheel spinner **230**.

By correlating this information with the relative position of the wheel spinner openings **233** and the time necessary to signal and engage the electromagnet **264**, the controller **266** can substantially align the wheel spinner **230** in a home position as shown in Figure 8A. Specifically, as the indexing mark **267** rotates to a known position that corresponds to a known wheel spinner **230** orientation (i.e., home angular orientation), the controller **266** may simply signal the electromagnet **264** to engage, and thus, stop the wheel spinner **230** in the desired location (i.e., the home position).

According to one embodiment, the controller **266** may trigger this alignment in response to manual or automatic stimuli. For example, a passenger could manually signal the controller **266** to align the wheel spinner **230** in the home position via an electronic switch or other similar means (not shown). Alternatively, the controller **266** may automatically align the wheel spinner **230** in response to various measured criteria, such as, the rotational speed of the wheel **220**. According to this embodiment, the controller **266** aligns the wheel spinner **230** when the speed of the wheel **220** falls below a pre-determined rotational velocity (e.g., when the wheel or wheel spinner substantially stops spinning).

Self-aligning mechanisms **260** as described above may create an interesting visual effect for observers viewing the wheel assembly **200** and also could potentially serve to reduce any undesirable consequences of the wheel spinner **230** spinning while the wheel **220** (and the vehicle on which the wheel and wheel spinner are mounted) are stopped. Although depicted as employing an electromagnet **264**, it is important to note that the aligning mechanism **260** of the present invention need not be magnetic, and in fact, could comprise various other types of mechanical braking systems known in the art.

A wheel spinner according to a further embodiment of the invention is configured to be selectively moved between a locked and an unlocked configuration. More particularly, as illustrated in Figures 9 - 10, several embodiments of the invention include a selectively-locking wheel assembly **300, 400** having a locking mechanism **370, 470** for selectively substantially preventing or restricting the rotation of the wheel spinner **330**,

430 relative to the wheel **320, 420**. According to various embodiments of the invention, the locking mechanism **370, 470** is moved into a locked position, wherein the locking mechanism **370, 470** serves to substantially restrict, and to preferably prevent, the spinner **330, 430** from rotating relative to the wheel **320, 420**. Thus, as the wheel **320, 420** is rotated during use, the spinner **330, 430** rotates in unison with the wheel **320, 420**. Moreover, when the locking mechanism **370, 470** is moved into an unlocked position, the spinner locking mechanism **370, 470** preferably does not substantially restrict the spinner **330, 430** from rotating relative to the wheel **320, 420**.

Figures 9A-9B illustrate one embodiment of the invention wherein the locking mechanism **370** is configured to allow a user to lock the locking mechanism **370** into one or more specific angular orientations relative to the wheel **320**. This prevents the wheel spinner **330** from rotating relative to the wheel **320**, thereby maintaining the spinner **330** in a particular orientation relative to the wheel **320**. Accordingly, a desired, a constant visual effect may be created by the combination of the wheel **320** and the locked spinner **330**. For example, in one embodiment of the invention, the locking mechanism **370** may be configured to allow a user to lock the wheel spinner in the "home" position shown in Figure 9A.

As will be understood by one skilled in the art in light of this disclosure, many different mechanisms may be used to lock the spinner **330** in place relative to the wheel **320**. For example, as illustrated in Figure 9A, a selectively-locking wheel assembly **300** is depicted comprising a wheel spinner **320**, a bearing assembly **340**, and a screw **373** or other similar fastener for selectively coupling the wheel spinner **320** to the bearing assembly **340**. As is apparent from the detail illustration provided by Figure 9B, the bearing assembly **340** is constructed and mounted to a vehicle's wheel mount bolts **319** as described above.

According to the depicted embodiment, the locking mechanism **370** is configured to be moved between locked and unlocked positions and includes a screw **373** and nut **372** assembly. The screw **373** is provided to extend through the axis of rotation of both the wheel spinner **330** and bearing assembly **340**. The nut **372** receives the screw **373** and may be selectively tightened or loosened to allow or prevent, respectively, the wheel spinner **330** from rotating relative to the bearing assembly **340** (and attached wheel **320**).

Further, the nut **372** may be selectively tightened or loosened to apply selective amounts of friction to the wheel spinner **330** and thereby regulate the rotational speed of the wheel spinner **330** relative to the bearing assembly **340** (and attached wheel **320**).

Figures 10A and 10B illustrate a selectively-locking wheel assembly **400** in accordance with yet another embodiment of the present invention. In particular, Figure 10A illustrates a front view of a selectively-locking wheel assembly **400** according to one embodiment wherein a wheel spinner **430**, a bearing assembly **440**, and a wheel **420** having various visual elements **425** disposed thereon are constructed as described above. According to the depicted embodiment, a locking mechanism **470** is provided that is comprised of a cap-nut **475**. The cap-nut **475** is adapted for engaging the portion of wheel mount bolt **419** that extends through the bearing assembly **340**. The cap-nut **475** is provided in place of at least one of the above-described lug nuts (not shown). The cap-nut **475** engages a wheel mount bolt **439** through a conventional access hole **436** of the type described above. In one embodiment, the cap-nut **475** is longer than conventional lug nuts and thus, may be seated within the access hole to restrict rotational movement of the wheel spinner **430**.

In one embodiment, the cap-nut **475** includes a flange portion **476** and a hozzle portion **477** as shown in Figure 10B. The hozzle portion **477** is threaded and configured to engage a conventional wheel mount bolt **419**. The hozzle **477** has a sufficient length to reach a wheel mount bolt **419** through a conventional access hole **436**. As referenced above, an access hole **436** is typically provided in the exterior surface of conventional wheel spinners in order to provide a technician with access to the wheel mounting lug nuts (not shown). Preferably, the hozzle **477** of the cap-nut **475** has a sufficient diameter to substantially snugly engage the outer perimeter of the access hole **436** as shown.

In one embodiment, the flange **476** is provided as a tactile gripping device for a user and to prevent the cap-nut **475** from receding entirely within the access hole **436**. Accordingly, upon installation the cap-nut **475** prevents rotation of the wheel spinner **430** relative to the wheel (not shown).

Figures 11, 13 and 14 illustrate various other themed wheel assemblies **500**, **600**, **700** in accordance with the invention. For example, various sports themes are provided wherein the wheel spinner **530**, **630**, **730** is configured to resemble a football helmet, a

football and a baseball bat respectively. As referenced above, various embodiments of the present invention include wheels **520, 620, 720** having a plurality of visual elements **525, 625, 725** (e.g., team logos, baseballs, etc.) disposed adjacent the exterior surface of the wheel **520, 620, 720**. In one embodiment, as illustrated in Figure 11, the wheel spinner **530** may be configured to resemble a football helmet having an opening **533** defined in a helmet portion **505**. Accordingly, the opening **533** defines a viewing area for viewing the plurality of visual elements **525** mounted to rotate adjacent the wheel **520**. In the depicted embodiment, the visual elements **525** are team logos that individually align with the spinner opening **533** in various predetermined angular orientations. Accordingly, a multiple team football helmet effect may be produced for viewers of the football helmet-themed wheel assembly **500** at relatively low speeds.

In another embodiment, a similar effect may be achieved using a football wheel spinner **630** as shown in Figure 13. In this embodiment, however, the football shaped wheel spinner **630** defines two openings **633** for aligning with the visual elements **625** of the wheel **620** at various predetermined angular orientations. In another embodiment, as illustrated in Figure 14, a baseball bat wheel spinner **730** may be provided that defines one or more openings **733** for viewing a plurality of baseball-related visual elements **725** mounted adjacent the exterior surface of a wheel **720**. In various other embodiments of the present invention, other similar themes as known to one of ordinary skill in the art (e.g., a roulette theme, a poker or playing card theme, etc.) may be created, such that visual effect produced is one not typically associated with vehicle wheels, and gives the wheel/wheel spinner combination the appearance of an object other than a wheel-related object.

In another embodiment, a stop-motion animation theme may be provided as illustrated in Figure 12. According to this embodiment, the second member **830** of the stop-motion wheel assembly **800** is not necessarily a "wheel spinner" as described above and is, in fact, configured to maintain a fixed radial orientation despite relative rotation of an adjacent wheel **820**. The second member **830** includes an opening **833** for viewing various stop-motion themed elements **825** that are disposed adjacent the exterior surface of the wheel **820** as shown. The fixed radial orientation of the second member **830**

causes the opening **833** defined therein to appear stationary (i.e., resist spinning relative to the wheel) when viewed by an observer.

Similar to the visual elements described above, a plurality of stop-motion elements **825** (depicted in Figure 12 as smiley faces) are disposed adjacent the exterior surface of a wheel **820**. The elements **825** are configured to rotate past the "window" provided by the opening **833** defined by the second member **830**. In one embodiment, the visual elements **825** (e.g., graphics, figures, etc.) may be slightly altered relative to one another such that as they move past the window (i.e., opening **833**) provided by the second member **830**, the elements proved an illusion of motion. In particular, the movement of the stop-motion elements **825** past the window appears to an observer as if a single stop-motion element is moving. In the depicted embodiment, a smiley face element **825** is provided that illustrates various stages of a smile **875**, **876**, **877**, **878**, **879**, **880**. Accordingly, as the various smiley face elements **825** rotate in a clock-wise direction past the opening **833** a smile movement is simulated.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.